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10/573,518	03/24/2006	Yoon Ho Song	CU4737RJS	5106
26530 7590 06/23/2008 LADAS & PARRY LLP 224 SOUTH MICHIGAN AVENUE SUITE 1600 CHICAGO, IL 60604				
EXAMINER				
HOLLWEG, THOMAS A				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/573,518

**Applicant(s)**

SONG ET AL.

**Examiner**

Thomas A. Hollweg

**Art Unit**

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 May 2006.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-24 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 24 March 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date 5/15/2006  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Inventor's Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on May 15, 2006, is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the field emission-inducing gate portion formed on a separate substrate, of claim 20, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

4. The following claims are objected to because of the following informalities:
- a. Claims 3, 7 and 23, the phrase "size of" in reference to the openings is unclear because a direction is not given. It is assumed that applicant intended this phrase to mean the diameter of the opening, or the largest cross-section of the opening if the opening is not a circle.
  - b. Claim 11, "the anode portion" lacks antecedent basis.
  - c. Claim 15, "the field emission-suppressing gate" lacks antecedent basis. A "field emission-suppressing gate electrode" and a "the field emission-suppressing gate portion" are identified.
- Appropriate correction is required.

***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140

F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

6. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

7. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 1-7 and 11-24 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the claims 1-15 of Song et al., U.S. Patent No. 7,176,615 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because all of the limitations claimed in the present claims are contained in the claims of the '615 patent, however they are reworded in an obvious manner with different resultant claim dependencies.

***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. The limitation "the field emission-suppressing gate portion is divided into plural ones per unit pixel" is not understood. It is unclear if the word "ones" means that "the field emission-suppressing gate portion is divided into plural *field emission-suppressing gate portions* per unit pixel," or if it means "the field emission-suppressing gate portion is divided into plural *field emission-suppressing gates* per unit pixel." Further, the meaning of this limitation is not clear from the claim language and it is discussed in the specification. Therefore, a search cannot be conducted with regard to this claim and it is not further treated on the merits.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-2, 4-6, 8, 11, 15-22 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Ge et al., U.S. Patent Application Publication No. 2002/0000771 A1.

14. With regard to claim 1, in figure 5, Ge discloses a field emission device (250) comprising: a cathode portion having a substrate(16), a cathode electrode (14) formed on the substrate (16), and a field emitter connected to the cathode electrode (14); a field

emission-suppressing gate portion (252) formed on the cathode portion around the field emitter and surrounding the field emitter; and a field emission-inducing gate portion (50) having a metal mesh with at least one penetrating hole, and a dielectric layer (254) formed on at least a part of the metal mesh, wherein the field emission-suppressing gate portion (252) suppresses electrons from being emitted from the field emitter, and the field emission-inducing gate portion (50) induces electrons to be emitted from the field emitter [0018-0032].

15. Examiner notes that the claim limitation "the field emission-suppressing gate portion suppresses electrons from being emitted from the field emitter, and the field emission-inducing gate portion induces electrons to be emitted from the field emitter" is drawn to a method of operating the claimed emission device and does not further limit the structure of the device explicitly. The claim limitation has been considered, however, absent a showing that the structure of the device is further limited, this method of operation limitation cannot distinguish the claimed device over the Ge (see MPEP 2114).

16. With regard to claim 2, in figure 5, Ge discloses that the dielectric layer (254) of the field emission-inducing gate portion (50) is formed on an entire surface or a portion of the surface of the metal mesh [0030].

17. With regard to claim 4, in figure 5, Ge discloses that the penetrating hole of the metal mesh (50) has at least one inclined inner wall [0018-0032].

18. With regard to claim 5, in figure 5, Ge discloses that the dielectric layer (254) covers the inclined inner wall of the penetrating hole [0018-0032].

19. With regard to claim 6, in figure 5, Ge discloses that the field emission-suppressing gate portion (252) is electrically insulated from the field emission-inducing gate portion (50), and has an insulator (56) with a field emission-suppressing gate opening therein, and a field emission-inducing gate electrode (50) formed on the insulator [0018-0032].

20. With regard to claim 8, in figures 2 and 5, Ge discloses that the inner wall of the metal mesh (50) includes a protrusion having at least two inclined angles [0018-0035].

21. With regard to claim 11, in figure 5, Ge discloses that a size of the penetrating hole of the metal mesh (50) in the cathode portion is larger than that in the anode portion [0018-0032].

22. With regard to claim 15, in figure 5, Ge discloses a field emission display device (250) comprising: a cathode portion including cathode electrodes (14) and field emission-suppressing gate electrodes (252) arranged in a stripe form to allow matrix addressing to be carried out [0021] and insulated from each other on a substrate (16), and pixels defined by the electrodes, each pixel having a field emitter connected to the cathode electrode (14); a field emission-suppressing gate portion (252) having an insulator (56) with a gate opening in the field emission-suppressing gate of the cathode portion formed on a region around the field emitter in the form of surrounding the field emitter; a field emission-inducing gate portion (50) having a metal mesh with at least one penetrating hole allowing electrons emitted from the field emitter to pass therethrough, and a dielectric layer (254) formed on at least a part of the metal mesh; and an anode portion having an anode electrode (32) and a phosphor (33) connected to



the anode electrode (32), wherein the field emission-suppressing gate portion (252) suppresses electrons from being emitted from the field emitter, and the field emission-inducing gate portion (50) induces electrons to be emitted from the field emitter so that the electrons emitted from the field emitter collide with the phosphor (33) via the penetrating hole [0018-0032].

23. Examiner notes that the claim limitation “the field emission-suppressing gate portion (252) suppresses electrons from being emitted from the field emitter, and the field emission-inducing gate portion (50) induces electrons to be emitted from the field emitter so that the electrons emitted from the field emitter collide with the phosphor (33) via the penetrating hole” is drawn to a method of operating the claimed emission device and does not further limit the structure of the device explicitly. The claim limitation has been considered, however, absent a showing that the structure of the device is further limited, this method of operation limitation cannot distinguish the claimed device over the Ge (see MPEP 2114).

24. With regard to claim 16, in figure 5, Ge discloses that the cathode portion, the field emission-suppressing gate portion (252), the field emission-inducing gate portion (50), and the anode portion are vacuum-packaged such that the field emitter of the cathode portion is opposed to the anode electrode (32) of the anode portion via a field emission-suppressing gate opening and the penetrating hole [0018-0032].

25. With regard to claim 17, examiner notes that the claim limitation “a constant direct current voltage is applied to the field emission-inducing gate portion to induce electron emission from the field emitter of the cathode portion, and a scan signal having

a negative voltage is input to the field emission-suppressing gate portion and a data signal having a positive or negative voltage is input to the cathode portion to display an image" is drawn to a method of operating the claimed emission device and does not further limit the structure of the device explicitly. The claim limitation has been considered, however, absent a showing that the structure of the device is further limited, this method of operation limitation cannot distinguish the claimed device over the Ge (see MPEP 2114).

26. With regard to claim 18, examiner notes that the claim limitation "a pulse amplitude or a pulse width of the data signal is modulated to represent a gray scale" is drawn to a method of operating the claimed emission device and does not further limit the structure of the device explicitly. The claim limitation has been considered, however, absent a showing that the structure of the device is further limited, this method of operation limitation cannot distinguish the claimed device over the Ge (see MPEP 2114).

27. With regard to claim 19, in figure 5, Ge discloses that the anode portion is composed of a transparent substrate (12), transparent electrodes (32) formed on the transparent substrate (12), phosphors of red (R) (33R), green (G) (33G) and blue (B) (33B) colors formed on a predetermined region of each transparent electrode (32), and a black matrix (not labeled) formed between the phosphors (33) [0018-0032].

28. With regard to claim 20, in figures 3A, 3B and 5, Ge discloses that the field emission-inducing gate portion (50) is formed on a separate substrate [0018-0032].

29. With regard to claim 21, in figure 5, Ge discloses that the cathode portion, the field emission-suppressing gate portion (252), and the field emission-inducing gate portion (50) are opposed to the anode portion using a spacer as a support (60) [0018-0032].

30. With regard to claim 22, in figure 5, Ge discloses that the dielectric layer (254) is formed on an entire surface or a part of the surface of the metal mesh (50) [0018-0032].

31. With regard to claim 24, in figure 5, Ge discloses that the penetrating hole of the metal mesh (50) has at least one inclined inner wall [0018-0032].

***Claim Rejections - 35 USC § 103***

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

33. Claims 3, 7 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ge as applied to claims 1, 6 and 15 above, in view of itself.

34. With regard to claim 3, Ge discloses all of the limitations as discussed in the rejection of claim 1 above, however, it does not give the relationship between the size of the penetrating hole to the thickness sum of the metal mesh and the dielectric layer.

35. Ge teaches dimensional relationships of the holes relative to other elements. Ge further teaches that the emitted electrons' transit trajectories (electron beams) originating from the emitters are controlled by the electric field in the spatial region of suppression and inducing electrodes and this electric field is a function of the applied

voltages to the anode, cathode, suppression and inducing electrodes as well as the distance between various electrodes and the aperture shape of the holes.

36. It has been held that where the general limitations of the claim are taught by the prior art, discovering an optimum or workable range involves only routine skill in the art (*In re Aller*, 105 USPQ 233 (CCPA 1955)). So, it would be within the capability of one having ordinary skill in the art to discover the ideal relationship between the size of the penetrating hole to the thickness sum of the metal mesh and the dielectric layer.

37. Therefore, at the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Ge emission device where a size of the penetrating hole of the field emission-inducing gate portion is not greater than one time to three times a thickness sum of the metal mesh and the dielectric layer.

38. With regard to claim 7, Ge discloses all of the limitations as discussed in the rejection of claim 6 above, however, it does not give the relationship between the size of the field emission-suppressing gate opening to the thickness insulator.

39. For the same reasons discussed in the rejection of claim 3, at the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Ge emission device where a size of the field emission-suppressing gate opening is one time to twenty times a thickness of the insulator.

40. With regard to claim 23, Ge discloses all of the limitations as discussed in the rejection of claim 15 above, however, it does not give the relationship between the size of the field emission-suppressing gate opening to the thickness insulator.

41. For the same reasons discussed in the rejection of claim 3, at the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Ge emission device where a size of the field emission-suppressing gate opening is one time to twenty times a thickness of the insulator.

42. Claims 9 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ge as applied to claim 1 above, and further in view of Blanchet-Fincher et al., U.S. Patent No. 5,578,901.

43. With regard to claim 9, Ge discloses all of the limitations, however, it does not expressly disclose that material comprising the metal mesh. In figure 4, Blanchet-Fincher teaches a metal mesh (13) comprising copper or aluminum (col. 7, line 49-65).

44. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Ge emission device where the metal mesh of the field emission-inducing gate portion is a metal plate formed of one of aluminum, iron, copper and nickel, or an alloy plate containing at least one of stainless steel, invar and kovar, as taught by Blanchet-Fincher, because these materials have excellent conduction properties.

45. With regard to claim 12, Ge discloses all of the limitations, however, it does not expressly disclose that material comprising field emitter. In figure 4, Blanchet-Fincher teaches a field emitter (11) of diamond (col. 8, lines 29-33).

46. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Ge emission device where the field emitter is formed of a thin or thick film formed of one of diamond, diamond like carbon, carbon nanotube, and

carbon nanofiber, as taught by Blanchet-Fincher, because diamond are highly efficient emitters.

47. With regard to claim 13, The Examiner notes that the claim limitation "the field emitter is formed by directly growing any one of diamond, diamond like carbon, carbon nanotube, and carbon nanofiber on the cathode electrode using a catalytic metal" is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Ge in view of Blanchet-Fincher (see MPEP 2113).

48. With regard to claim 14, The Examiner notes that the claim limitation "the field emitter is formed by printing a paste containing any one of powder type diamond, diamond like carbon, carbon nanotube and carbon nanofiber" is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Ge in view of Blanchet-Fincher (see MPEP 2113).

***Conclusion***

49. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas A. Hollweg whose telephone number is (571) 270-1739. The examiner can normally be reached on Monday through Friday 7:30am-5:00pm E.S.T..

50. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

51. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TH/

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